

TIME CODE GENERATOR

THE A. W. HAYDON COMPANY

Electronic Timing Devices and Test Equipment

TELEPHONE UPTON 0-5461



4060 INCE BOULEVARD
CULVER CITY, CALIFORNIA

September 1965

Mr. T. Nelson, Systems Cons
Box 1546
Poughkeepsie, ^NNew York 12603

Dear Mr. Nelson:

You previously requested literature on A. W. Haydon Company Time Code Generators. Enclosed you will find our specification 3548 which describes a standard airborne Time Code Generator. The coded output is modified IRIG B format.

If further information is required for this standard unit or for a special application, please do not hesitate to call us or contact our representative in your area who is:

W. H. Zimmerman, Inc.
112 Dewitt St., Syracuse, New York
or 3100 Monroe Ave., Rochester, New York

Very truly yours,

THE A. W. HAYDON COMPANY
Electronics Systems Facility


John W. Sheerin
Sales Manager

JWS/fb

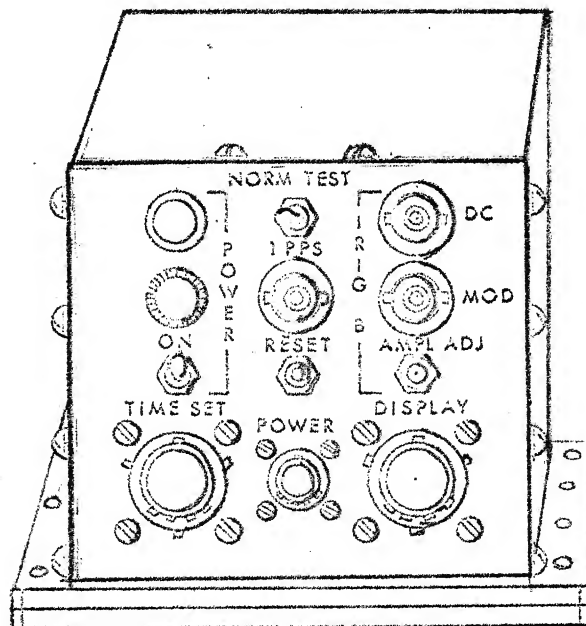
encl. - Literature

TIME CODE GENERATOR

3548-1

1.0 SCOPE

This specification describes The A. W. Haydon Company, Model 3548-1, Time Code Generator System for use in high performance aircraft and missiles. It generates a serial BCD time-of-day code for recording on magnetic tape for time correlation of recorded data. Accessories provide for remote in-line visual display in hours, minutes and seconds, and for remote control of start, stop, reset and preset of time, and operation from a battery power source.



3548-3 AIRBORNE TIME CODE GENERATOR

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2.0 APPLICABLE DOCUMENTS

The following documents are applicable to the extent specified herein:

IRIG 104-60	Inter Range Instrumentation, Group (IRIG) Standard Time Formats
MIL-I-26600	Interference Control Require- ments, Aircraft Equipment.
MIL-E-5400	Electronic Equipment, Aircraft General Specification for
MIL-E-5272	Environmental Testing, Aero- nautical and Associated Equip- ment, General Specification for
MIL-STD-202	Test Methods for Electronic and Electrical Component Parts
MIL-STD-704	Electrical Power, Aircraft, Characteristics and Utilization of
MS25212	Control Panel, Console Type, Aircraft Equipment, Basic Dimensions

Subject to change without notice

TCG 3548-1

3.0 DESCRIPTION

3.1 General

The Time Code Generator System 3548-1 consists of a Time Code Generator and several optional accessories as follows:

<u>Title</u>	<u>Part No.</u>
Time Code Generator	3548-3
Time Code Generator with Internal Battery	3548-3B
Remote Visual Display	3548-5
Remote Time Set Control	3548-7
Display Cable (25 ft)	3548-9
Control Cable (5 ft)	3548-11
Auxillary Battery Pack	3548-13
Battery Cable	3548-15

Figures 1 thru 4 show the essential configuration and dimensions of these units.

3.2 Materials, Parts and Processes

The equipment design, and fabrication generally conform to MIL-E-5400 and are equal to or exceed best commercial practice, relating to material processing, quality of material, quality control, component derating, workmanship, test standards and electrical and mechanical parts standards.

3.3 Circuit Design

The Time Code Generator utilizes all silicon, solid-state logic circuits.

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3.3 Circuit Design (cont'd)

The circuitry is designed for worst-case conditions of power input, and environment. This insures reliable operation under all conditions that the unit is expected to encounter.

3.4 Modules

The module packaging system of building block elements is compatible with the reliability consideration of restricting plug-in connections to a minimum as a trade-off with ease of repairability.

3.5 Short-Circuit Protection

All output circuits are short-circuit proof. The grounding of any logic signal output terminal will not result in damage to the circuit or unit operation. As soon as the short circuit is removed, the output will return to normal operation.

3.6 Interference Control

The Time Code Generator and accessories (including shielded inter-connecting cables) are designed using standard interference control techniques and when adequate case grounding is supplied, the system will conform with the test requirements of MIL-I-26600 for interference and susceptibility.

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4.0 PERFORMANCE SPECIFICATIONS

4.1 Power Requirements

The Time Code Generator operates from 20 to 29 VDC power per MIL-STD-704 except that positive 80V transients must be limited to 12 volt-seconds total energy to avoid possible damage.

Current drain is 750 ma maximum, except when the optional remote display is used, the current is 1 ampere maximum.

The generator will not lose accuracy as a result of power interruptions of 1.5 milliseconds maximum without the optional battery supply.

Reverse polarity protection is 600 PIV.

4.2 Outputs

4.2.1 Serial Time Code

The Time Code Generator provides a serial BCD encoded Time-of-Day Code in accordance with IRIG Format B (see Fig. 5). The output is from zero to 2 volts $\pm 5\%$ peak into a 1K ohm load shunted by .01 microfarad.

4.2.2 Modulated Carrier

The serial BCD Time-of-Day Code is also supplied as a modulated 1KC/S sine wave carrier, with a 10/3 mark/space ratio, in accordance with IRIG Format B. The positive zero crossing is synchronous with the encoding waveform within ± 10 microseconds. The output level is variable from zero to 2 volts peak into a 1K ohm load shunted by .01 microfarad.

4.2.3 Parallel BCD Code

The true outputs of the Time-of-Day register flip flops are provided in a parallel, 20 line, BCD format. These outputs may be used to drive the optional remote display described in para. 4.5, or may be used as a computer input or similar application. The outputs are $0 \pm .5$ VDC for binary "0" and 4.7K ohms to +10 VDC for binary "1".

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4.2.4 Pulse Trains

The generator also provides three pulse train outputs of 1KPPS, 100PPS and 1PPS. The leading edges are "ON TIME" and synchronous with the time codes. The outputs are as follows:

For the 1KPPS and 100PPS:

Low State: $0 \pm .5$ VDC

High State: 4.7K ohms to +10 VDC

Duty Cycle is 50%

For the 1PPS:

Low State: 3.3K ohms to -10 VDC clamped to $0 \pm .5$ VDC

High State: +5 VDC minimum with a 1K ohm load.

Duty Cycle is 50%

4.3 Accuracy

The Time Code Generator incorporates a crystal controlled time base oscillator in a constant temperature oven. The stability of the oscillator is better than ± 1 part in 10^5 per day. Stabilities of ± 1 part in 10^6 per day are possible as a special modification. An internal trimming adjustment is provided to correct long term frequency drift.

4.4 Controls & Indicators

4.4.1 Time Code Generator (3548-3)

The Time Code Generator provides the following controls and indicators on its front panel.

4.4.1.1 Power ON-OFF Switch

This switch controls both main power and battery operation.

4.4.1.2 Power ON Indicator Lamp

This lamp indicates main power applied and power switch ON.

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4.4.1.3 Power Fuse

The fuse is in series with main power and the auxillary battery supply.

4.4.1.4 Normal Test Switch

This switch causes a speed-up of the count rate by a factor of ten, thus permitting a test of a 24 hour code in 2.4 hours.

4.4.1.5 IRIG B Amplitude Adjustment

This control provides level adjustment of the modulated output from zero to 2 volts peak.

4.4.1.6 Reset Switch

This switch permits reset of the time register to zero.

4.4.1.7 Remote Reset

This control feature permits time register reset to zero with an external remote contact.

4.4.1.8 Remote Start/Hold

This control feature permits remote control of the time register counting with an external remote contact.

4.4.2 Remote Time Set Control Unit (3548-7)

The Remote Time Set Control Unit provides the following controls on its front panel

4.4.2.1 Time Set Switches

Six thumbwheel switches permit the time-of-day to be set into time register.

4.4.2.2 Set Switch

This switch transfers the time on the Time Set Switches to the time register.

4.4.2.3 Reset Switch

This switch permits reset of the time register to zero.

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4.4.2.4 Start/Hold

This switch permits stopping the time register count with the output codes and pulse trains continuing to operate.

4.5 Remote Display (3548-5)

The optional Remote Display Unit provides an in-line decimal display of the time-of-day in hours, minutes and seconds. The display elements are the 5/16 high NIXIE* type gas discharge tubes. This unit is controlled by the parallel BCD code of para. 4.2.3 and powered by a high voltage supply generated by the Time Code Generator.

* Trademark of Burroughs Corp.

4.6 Battery Operation

The Time Code Generator can be supplied with an Accessory Battery Pack, 3548-13, which will continue operation of the generator during power loss. The battery pack is ideal for transporting the generator from a calibration laboratory to the aircraft without loss of time accuracy. Operate times on battery power are as follows:

<u>OPERATING CONDITION</u>	<u>OPERATE TIME</u>
a. No loads (transportation)	40 min.
b. All loads except display	25 min.
c. All loads including display	15 min.

The battery may be specified integral with the Time Code Generator rather than as an accessory pack by specifying part number 3548-3B.

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5.0 SERVICE CONDITIONS (ENVIRONMENTAL)

The Time Code Generator and accessories will operate without degradation of performance or damage with any reasonable combination of the following environmental conditions except as noted.

5.1 Temperature

Normal Power:

Operation: -35°C to +65°C

Storage: -55°C to +85°C

Battery Power:

Operation: 0°C to +50°C

Storage: -35°C to +65°C

5.2 Altitude:

100,000 feet.

5.3 Vibration

15g, 5 to 500 cps per MIL-STD-202 Method 204A.

5.4 Shock

15g for 11 ±1 ms per MIL-STD-202 Method 205B.

5.5 Humidity

Per MIL-STD-202 Method 103A.

5.6 Salt Air

As encountered in coastal regions.

5.7 Fungus

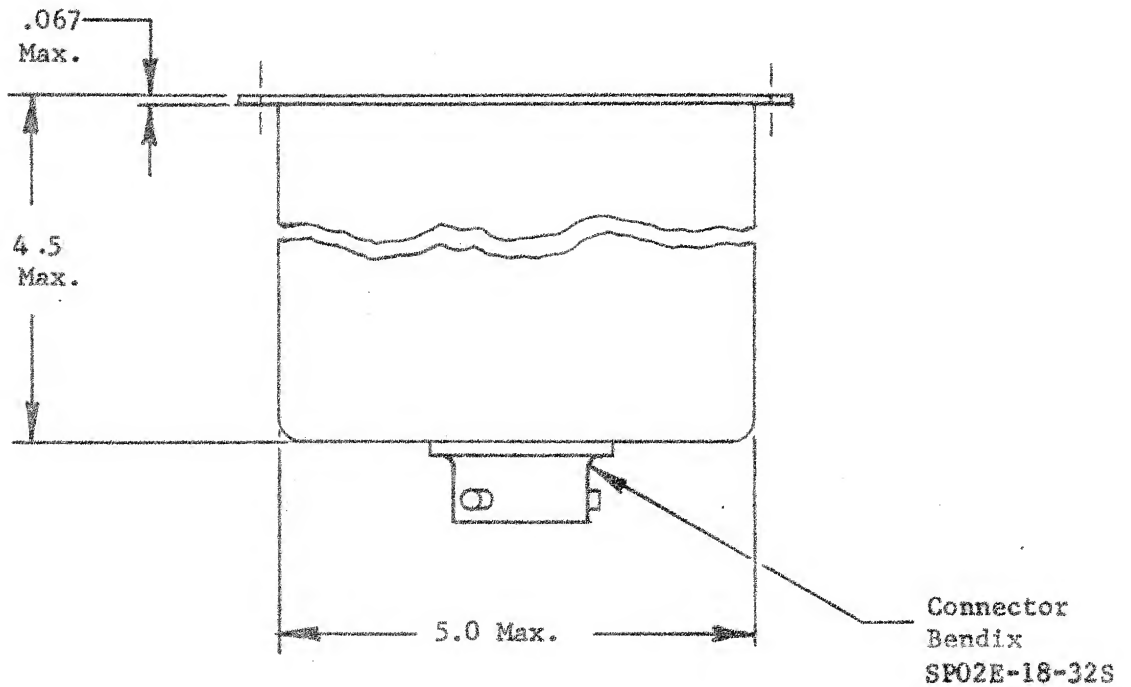
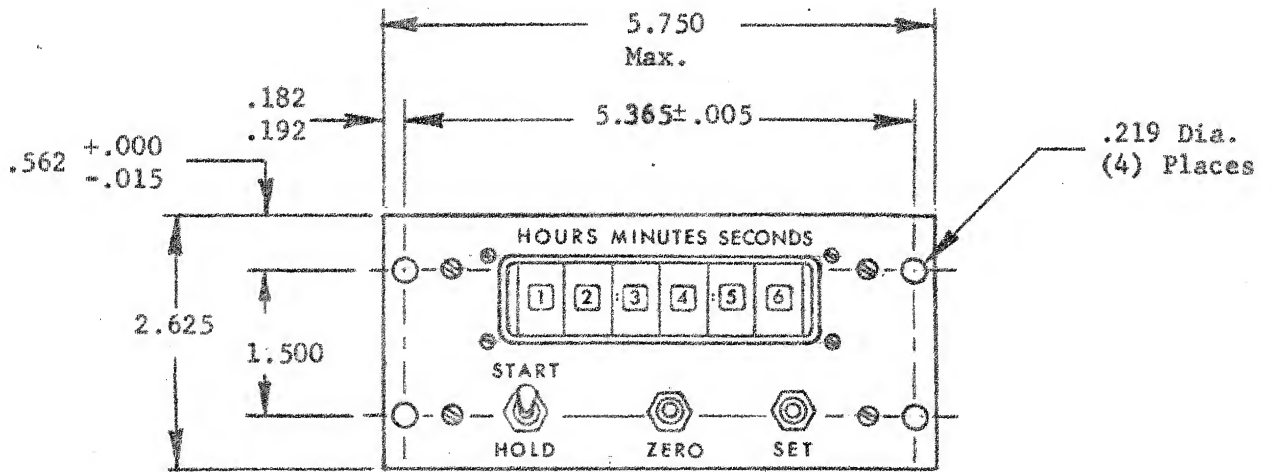
As encountered in tropical climates.

5.8 Explosive Atmosphere

As encountered in normal aircraft operation.

Subject to change without notice

DR. SD/gh	DATE 8/25/65	TITLE REMOTE TIME SET CONTROL	DRAWING NUMBER 3548-1	ISSUE
CHK.		3548-7		
APPR. <i>SD/gh</i>	8/25/65	THE A. W. HAYDON COMPANY CULVER CITY, CALIFORNIA, U.S.A.	SHEET OF	



Dimensions Conform
To MS 25212

Wt. = 1.5 Lbs. Max.

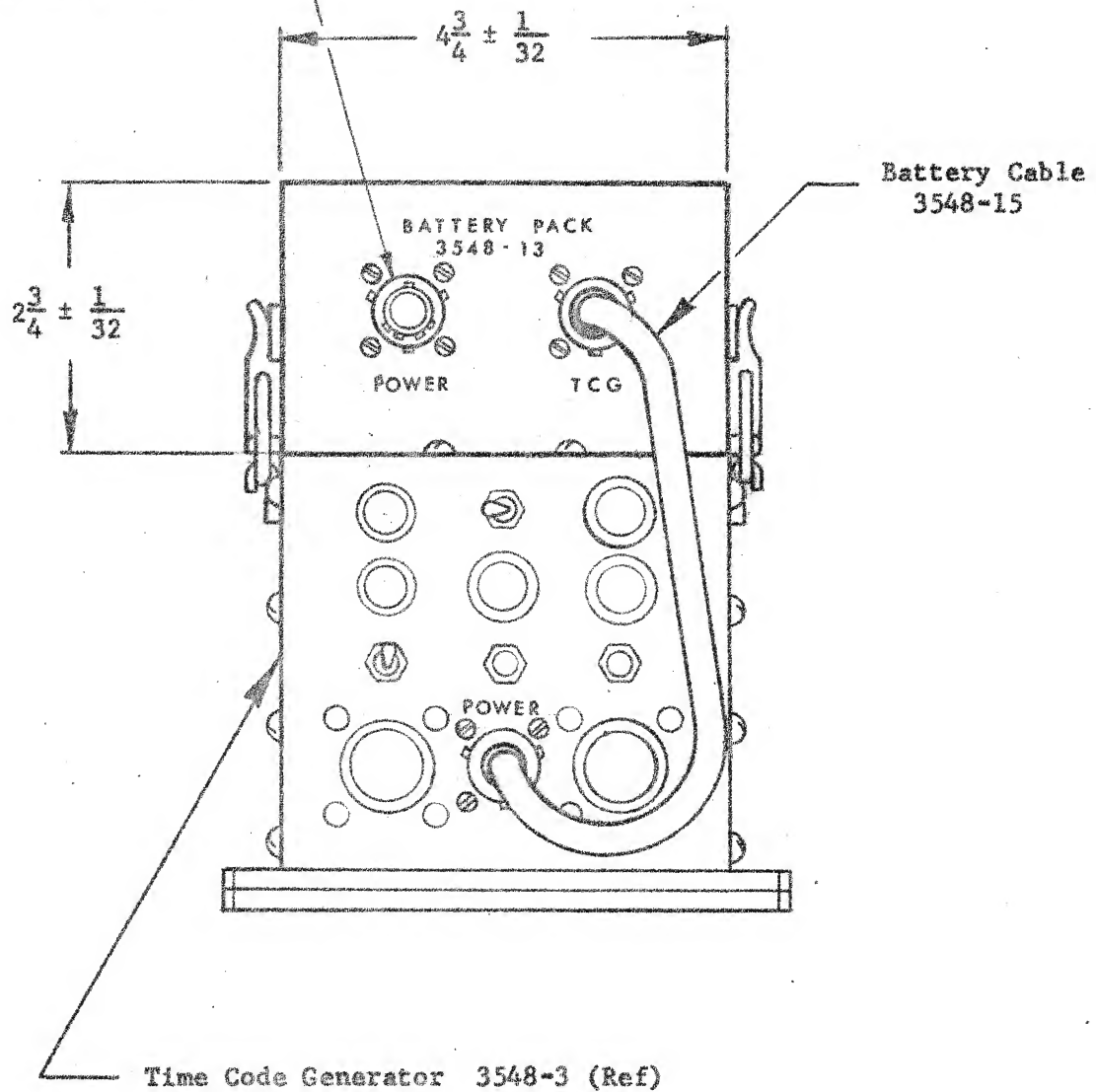
Figure 3

LEY.										DRAWING NUMBER	ISSUE
CHANGE										3548-1	
DATE											

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DR. SD/gh	DATE 8/25/65	TITLE BATTERY PACK 3548-13	DRAWING NUMBER 3548-1	ISSUE
CHK.		THE A. W. HAYDON COMPANY CULVER CITY, CALIFORNIA, U.S.A.	SHEET OF	
APPR. <i>SD/gh</i>	8/25/65			

Connector
Bendix SP02E-10-6P



Wt. = 4.5 Lbs. Max.

Figure 4

LET.																			
CHANGE																			
DATE																			

DRAWING NUMBER 3548-1	ISSUE
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